Review article

Revitalizing Dental Diagnostics: A Bibliometric Analysis of the Rising Impact of 3D Imaging in Dentistry

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Abstract.

*Background and Objectives***:** The aim of this bibliometric analysis is to explore the impact of 3D imaging in dentistry by examining articles published over the past two decades.

*Materials and Methods***:** The electronic search utilized the terms "digital dentistry" AND "implant placement" OR "radiation dose" OR "accuracy" OR "clinical outcomes" OR "3D imaging" OR "cone beam computed tomography" OR "CBCT" OR "CAD/CAM technol*" OR "intraoral scanner* OR "dental implant*" OR "orthodont*" OR "prosthodont*" OR "treatm* planning*". The search was conducted using the Web of Science database and restricted to publications from 1996 to 2022.

*Results***:** The results revealed that the United States had the most publications related to digital dentistry. The University of Michigan was identified as the most prolific institution, with the highest number of papers published in digital dentistry. King's College London in the UK was the second most cited institution for their published papers.

*Conclusions***:** This bibliometric analysis provides valuable insights into the impact of 3D imaging in dentistry and the most active areas of research. The findings of this study can guide future research and identify key research areas that require further investigation.

Clinical application: This study highlights the transformative role of 3D imaging in enhancing diagnostic accuracy and treatment planning in dentistry. By providing detailed insights into dental structures, 3D imaging improves patient outcomes and enables more personalized care. The analysis underlines the need for further adoption and training in 3D imaging technologies across dental practice.

Keywords: Digital Dentistry; CAD/CAM; 3D Imaging; Dental Implants; Treatment Planning

1. Introduction

The field of dentistry has undergone many advancements over the past few decades, most of which have been primarily driven by new technologies. Among these developments, three-dimensional (3D) imaging technology has emerged as a valuable tool for dental imaging. Three-dimensional (3D) imaging offers a significantly higher level of accuracy and precision than traditional two-dimensional (2D) radiographic techniques. The increased accuracy and precision of 3D imaging technology have led to its increased adoption in dentistry. Dentistry is widely acknowledged to benefit from 3D printing technologies because of the need for customization and personalization of dental products.[1] Therefore, a bibliometric analysis of the impact of 3D imaging in dentistry is a crucial research area that can help shed light on the multidimensional scope of this advanced imaging technology.

Bibliometric analysis is a quantitative method used to understand the emergence, evolution, and impact of research areas and technologies based on patterns of publication. Bibliometric analysis can reveal important insights into the development of specific fields, collaboration of researchers, and dissemination and impact of research results. Bibliometric analysis is a robust and powerful tool that can be used to measure the impact and emergence of 3D imaging technology in dentistry.[2-5]

To date, many studies have highlighted the growing adoption of 3D imaging technology in dentistry and its impact on improving patient outcomes and increasing the efficiency of dental treatment.[6,7] However, there is a significant gap in our understanding of the impact and development of this technology through bibliometric analysis. Therefore, this study aimed to explore the impact of 3D imaging on dentistry by conducting a bibliometric analysis.

This study will involve a systematic literature review of studies published in indexed journals from well-known academic databases, such as Web of Science, Scopus, PubMed, and Google Scholar.

The review will cover publications from the last two decades (2000-2020) and search terms related to "3D imaging," "dental," and "dentistry." These search terms were used to retrieve all studies relevant to this research area. The analysis is based on the number of publications, their citation frequency, and the most active and influential authors, institutions, countries, and sources.

Bibliometric data will be analyzed using VOS viewer, a software program designed to visualize and analyze bibliometric data. VOS viewers provide in-depth analysis and insights into individual documents, authors, institutions, and sources. The main aim of using VOS viewer is to identify the underlying intellectual structure of the field and the most active research areas as well as to identify the leading authors and their contribution to the evolution of the field.[8-10]

The results of this bibliometric analysis provided comprehensive insights into the impact of 3D imaging technology in dentistry. The findings of this study will have significant implications for future research, as they will help identify areas that require further investigation and provide an overview of the literature to date. Furthermore, this study sheds light on the driving forces behind the growth and impact of 3D imaging technology in dentistry. It will also shed light on research

areas that have gained considerable attention in the past and identify the most active authors, institutions, and countries that contribute to the growth of this field.

In conclusion, there is growing evidence of the impact of 3D imaging technology in dentistry.[11-14] Despite this, there is still a significant gap in the literature regarding bibliometric analysis for understanding the impact of this technology. This study aimed to fill this gap by exploring the literature written over the past two decades on the impact of 3D imaging technology in dentistry. The results of this study will be useful to researchers, dentists, and other healthcare professionals working in the field of dentistry, as it will help them understand the multidimensional scope of 3D imaging technology and its contribution to improving patient outcomes and driving the growth of dental innovation.

2. Materials and Methods

The present bibliometric analysis was conducted using Clarivate's Web of Science database on May 24, 2023, following online scrutiny of research papers. The search criteria included "digital dentistry" AND the following keywords: "implant placement," "radiation dose," "accuracy," "clinical outcomes," "3D imaging," "cone beam computed tomography," "CBCT," "CAD/CAM technology," "intraoral scanner," "dental implants," "orthodontics," "prosthodontics," and "treatment planning." The search was conducted between 1996 and 2022 without any restrictions on the study design.

To establish the inclusion criteria, we selected papers 1) published in English, 2) classified as "articles," 3) within the research areas of digital dentistry, prosthodontics, and orthodontics, and 4) present in the Web of Science citation index's Science Citation Index Expanded. The exclusion criteria for the bibliometric analysis included 1) subject specialties outside of dentistry, 2) papers not related to digital dentistry, and 3) articles published after 2022.

After conducting independent reviews of the articles and abstracts presented in the Web of Science database, we selected only relevant papers for further analysis, while excluding irrelevant materials. All the selected papers were accessed from the Web of Science database and saved as TXT files. We employed VOS Viewer Software (v1.6.19) developed by Nees Jan van Eck for the analysis.

Using VOS viewer, we generated visual representations of a network of keywords. The maps also represent distinct meanings using different colours. We selected keywords with the highest occurrences to produce visualization maps.

3. Results

Using VOS viewer, we generated visual representations of a network of keywords. The maps also represent distinct meanings using different colours. We selected keywords with the highest occurrences to produce visualization maps.

3.1. Publications count

The patterns of research articles published in the field of digital dentistry are shown in Figure 1. Although publications began in 1996, the trend significantly increased in 2015, with the publication of more than ten papers. Researchers began taking a positive interest in this field, an equal number of papers ($n = 23$) were published in 2018 and 2019. The publication count increased to 50 papers in 2020 and 67 papers in 2021. The number of published papers significantly increased by 2022 ($n = 90$).
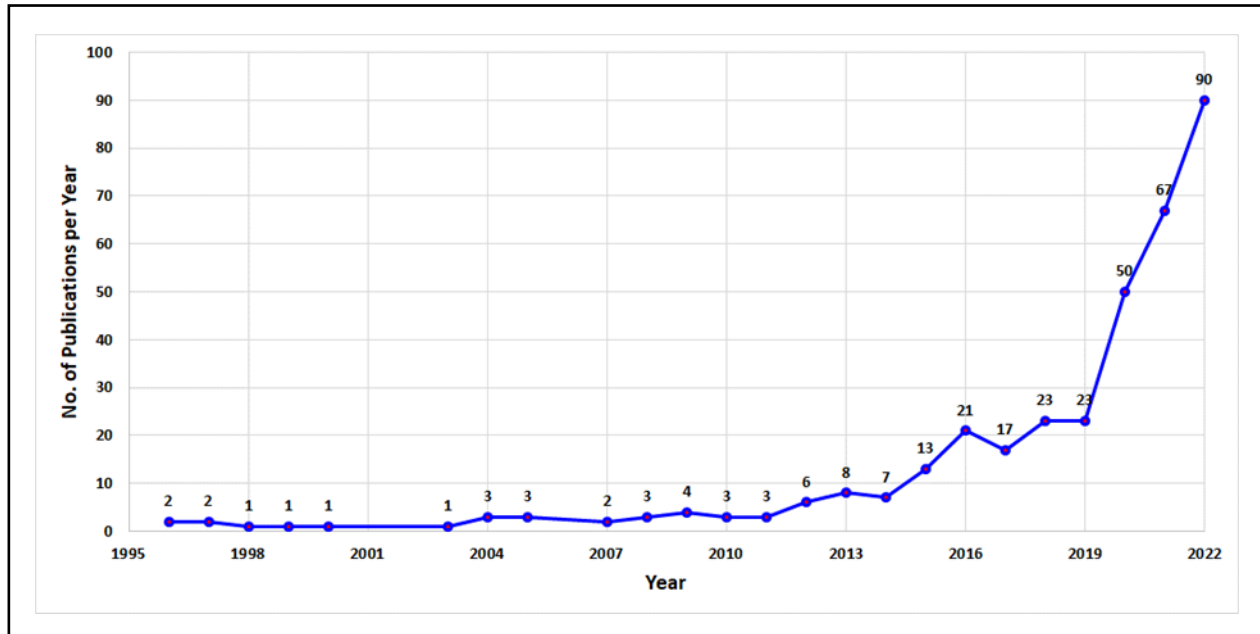
Figure 1. Visual representation of the yearly count of articles published in digital dentistry.

Table 1. Top nations contributing

Rank	Country	Documents	Citations	Average citation per paper	Total Link Strength
1	USA	113	1964	17.38	297
2	Germany	36	1095	30.42	120
3	Switzerland	24	587	24.46	86
4	Italy	39	480	12.31	109
5	England	12	458	38.17	29
6	South Korea	25	385	15.40	64
7	Netherlands	13	349	26.85	58
8	Peoples R China	27	322	11.93	79
9	Brazil	32	279	8.72	92
10	Sweden	13	233	17.92	45
11	Spain	11	194	17.64	14
12	Japan	18	186	10.33	24
13	France	10	138	13.80	16
14	Austria	4	108	27.00	24

15	Turkey	14	99	7.07	19
16	Taiwan	8	95	11.88	22
17	Saudi Arabia	12	91	7.58	48
18	Egypt	11	86	7.82	49
19	Wales	2	85	42.50	2
20	Belgium	8	75	9.38	29

3.2. Leading countries

As shown in Table 1, 16 out of the 50 countries met the criteria for publishing a minimum of 10 papers on digital dentistry. The United States published the highest number of papers (*n*= 113), with an average citation count per paper of 17.38. Germany published 36 papers with a per-paper citation of 30.42, while Italy published 39 papers with an average citation per paper of 12.31. Notably, despite publishing only two papers, Wales received the highest average citation (42.50), followed by Austria with four articles and an average citation per paper of 27.00. The United States received the highest number of citations (*n*= 1964), followed by Germany (*n*= 1095) and Switzerland (*n*= 587). The top collaborating countries in digital dentistry were the United States, Germany, and Italy, which had total link strengths of 297, 120, and 109, respectively.

Figure 2 shows the collaboration among different countries in digital dentistry. The United States collaborated with Italy, China, Switzerland, and Wales to publish papers related to this field.
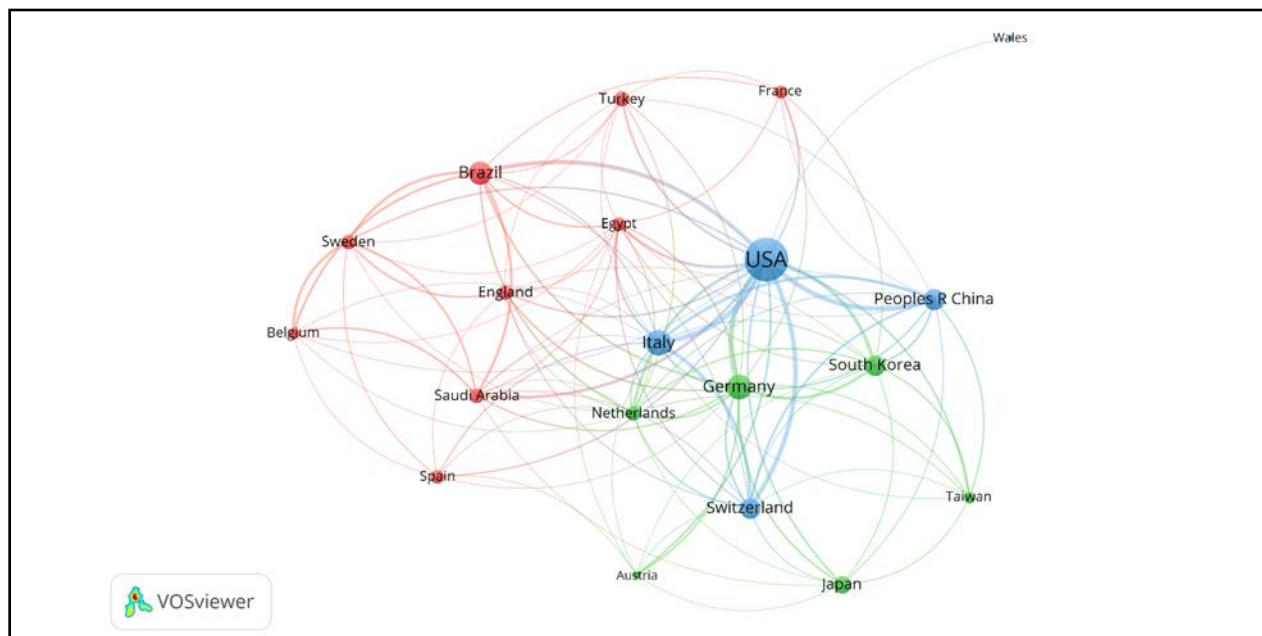
Figure 2. Collaborative alliance of multiple countries in digital dentistry.

3.3. Prominent institutions

Table 2 presents the top 20 institutions that published papers related to digital dentistry among the 474 organizations. The University of Michigan from the United States and the University of São Paulo from Brazil both published the highest number of papers (*n*= 17) related to digital dentistry, with average citations per paper of 7.76 and 7.41, respectively. Surprisingly, the University of Munich in Germany published only one paper (*n*=1) but received the highest average citation (482.00), followed by the Charité Campus Virchow Clinic and the University Medical Center Freiburg, both from Germany, who each received an average citation of 295.00 for their one published paper.

In terms of the highest citation count received by an organization, the University of Munich in Germany received the highest citations (482), followed by King's College London in the UK, and the Charite Campus Virchow Clinic in Germany, with 428 and 295 citations, respectively. In addition, with total connection strengths of 129, 98, and 98, respectively, the Universities of Michigan, Tufts, and So Paulo were among the most collaborating institutions.

Table 2. Top contributing institutions

Rank	Organization	Country	Documents	Citations	Average citation per paper	Total link strength
1	University of Munich	Germany	1	482	482.00	37
2	King's College London	United Kingdom	6	428	71.33	46
3	Charité Campus Virchow Clinic University	Germany	1	295	295.00	52
4	Medical Center Freiburg	Germany	1	295	295.00	52
5	Tufts University	United States	16	261	16.31	98
6	Radboud University Nijmegen	Netherlands	10	202	20.20	68
7	Seoul National University	South Korea	8	199	24.88	15
8	University of Zurich	Switzerland	8	193	24.13	34
9	Oregon Health & Science University	United States	1	191	191.00	5

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10	Medical University of South Carolina	United States	6	189	31.50	61
11	Yonsei University	South Korea	10	171	17.10	65
12	University of Catania	Italy	10	168	16.80	65
13	University of Manchester	England	2	161	80.50	3
14	University of Milan	Italy	7	161	23.00	37
15	University of Bern	Switzerland	7	159	22.71	46
16	University of Michigan	United States	17	132	7.76	129
17	University of São Paulo	Brazil	17	126	7.41	98
18	University of Texas at Austin	United States	1	124	124.00	25
19	Shanghai Jiao Tong University	China	3	121	40.33	17
20	Columbia University	United States	3	119	39.67	24

3.4. Top contributing authors

Table 3 highlights the top 20 authors out of 1383 who have significantly contributed to the field of digital dentistry. Papaspyridakos published the most papers, with 12 publications receiving an average citation of 19.25. Joda and Beuer followed closely, having published $n=9$ and $n=6$ papers, respectively, with average citation counts of 22.33 and 88.17. Among the highly cited authors were Beuer, with 529 citations, followed by Schweiger and Edelhoff, with $n=507$ and $n=482$ citations, respectively. Papaspyridakos P, Joda T, and Beuer F collaborated the most, with 261, 183, and 146 total connected strength, respectively.

Figure 3 shows the combined endeavors of the authors in digital dentistry research. Beuer F collaborated with Schweiger J, Edelhoff D, Nelson K, Nahle S, Fluegge TV, Schlager S, Mannocci F, and Metzger MC.

Table 3. Most influential writers

Rank	Author	Papers	Citations	Average citation per article	Combined Strength
1	Beuer, F	6	529	88.17	146
2	Schweiger, J	3	507	169.00	95
3	Edelhoff, D	1	482	482.00	85
4	Patel, S	4	359	89.75	34
5	Mannocci, F	3	314	104.67	26
6	Dawood, A	2	311	155.50	21
7	Wilson, R	2	311	155.50	21
8	Fluegge, TV	1	295	295.00	123
9	Metzger, MC	1	295	295.00	123
10	Nahles, S	2	295	147.50	134
11	Nelson, K	2	295	147.50	134
12	Schlager, S	1	295	295.00	123
13	Papaspyridakos, P	12	231	19.25	261
14	Weber, HP	5	202	40.40	136
15	Joda, T	9	201	22.33	183
16	Athirasala, A	1	191	191.00	13
17	Bertassoni, LE	1	191	191.00	13
18	Bompolaki, D	1	191	191.00	13
19	Ferracane, JL	1	191	191.00	13
20	Fugolin, AP	1	191	191.00	13
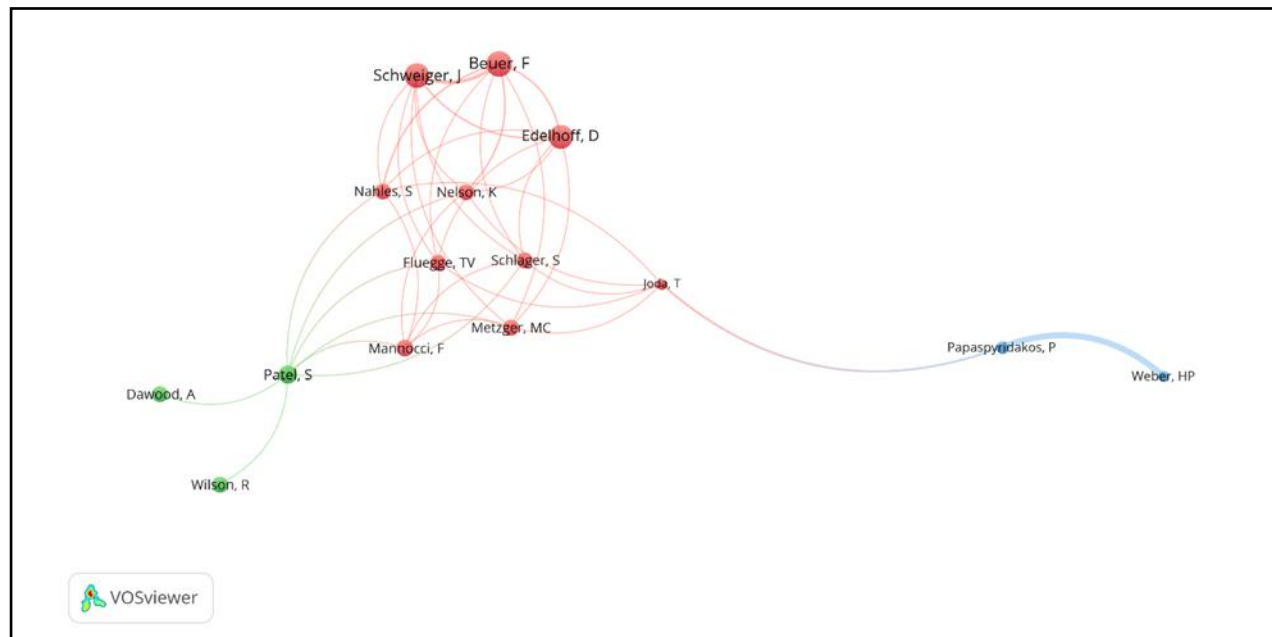
Figure 3. Combined endeavors of authors on digital dentistry research.

**Table 4.** Top contributing institutions

Rank	Journal	Articles Published	Citations	Average citation per paper	Total link strength
1	American Journal of Orthodontics and Dentofacial Orthopedics	23	905	39.35	75
2	British Dental Journal	3	490	163.33	15
3	Journal of Prosthetic Dentistry	23	478	20.78	51
4	Clinical Oral Implants Research	9	403	44.78	27
5	International Endodontic Journal	4	367	91.75	8
6	Journal of Prosthodontics-Implant Esthetic and Reconstructive Dentistry	35	340	9.71	46
7	Dental Materials	5	305	61.00	18
8	International Journal of Computerized Dentistry	18	303	16.83	38
9	Journal of Esthetic and Restorative Dentistry	26	195	7.50	33
10	Journal of Oral and Maxillofacial Surgery	6	192	32.00	22
11	Journal of Prosthodontic Research	13	182	14.00	41
12	BMC Oral Health	10	154	15.40	16
13	Clinical Oral Investigations	13	145	11.15	27
14	Journal of Dentistry	18	136	7.56	21
15	Dentomaxillofacial Radiology	8	127	15.88	3
16	Journal of Orofacial Orthopedics-Fortschritte der Kieferorthopadie	4	117	29.25	11

3.5. Prominent scientific journals

Table 4 lists the top 16 most frequently referenced journals among the 66 published papers on digital dentistry. To meet the inclusion criteria, the journals had to publish at least five documents related to the field. The Journal of Prosthodontics-Implant Esthetic and Reconstructive Dentistry contributed significantly to the field by publishing *n*=35 papers, with an average citation per paper of 9.71. Similarly, the Journal of Esthetic and Restorative Dentistry published 26 papers, with an average citation per paper of 7.50. The American Journal of Orthodontics and Dentofacial Orthopedics published 23 papers but received the highest average number of citations per paper (39.35) compared to journals that published more documents.

In terms of citation count, the American Journal of Orthodontics and Dentofacial Orthopedics received the highest citations (905), followed by the British Dental Journal and Journal of Prosthetic Dentistry, which received 490 and 478 citations, respectively. The American Journal

of Orthodontics and Dentofacial Orthopedics, Journal of Prosthetic Dentistry, Journal of Prosthodontics-Implant Esthetic and Reconstructive Dentistry, and Journal of Prosthodontic Research achieved the highest total link strength, with values of 75, 51, 46, and 41, respectively (Figure 4). papers published in the Journal of Prosthodontics-Implant Esthetic and Reconstructive Dentistry, Journal of Esthetic and Restorative Dentistry, and American Journal of Orthodontics and Dentofacial Orthopedics attracted substantial citations from scholars.
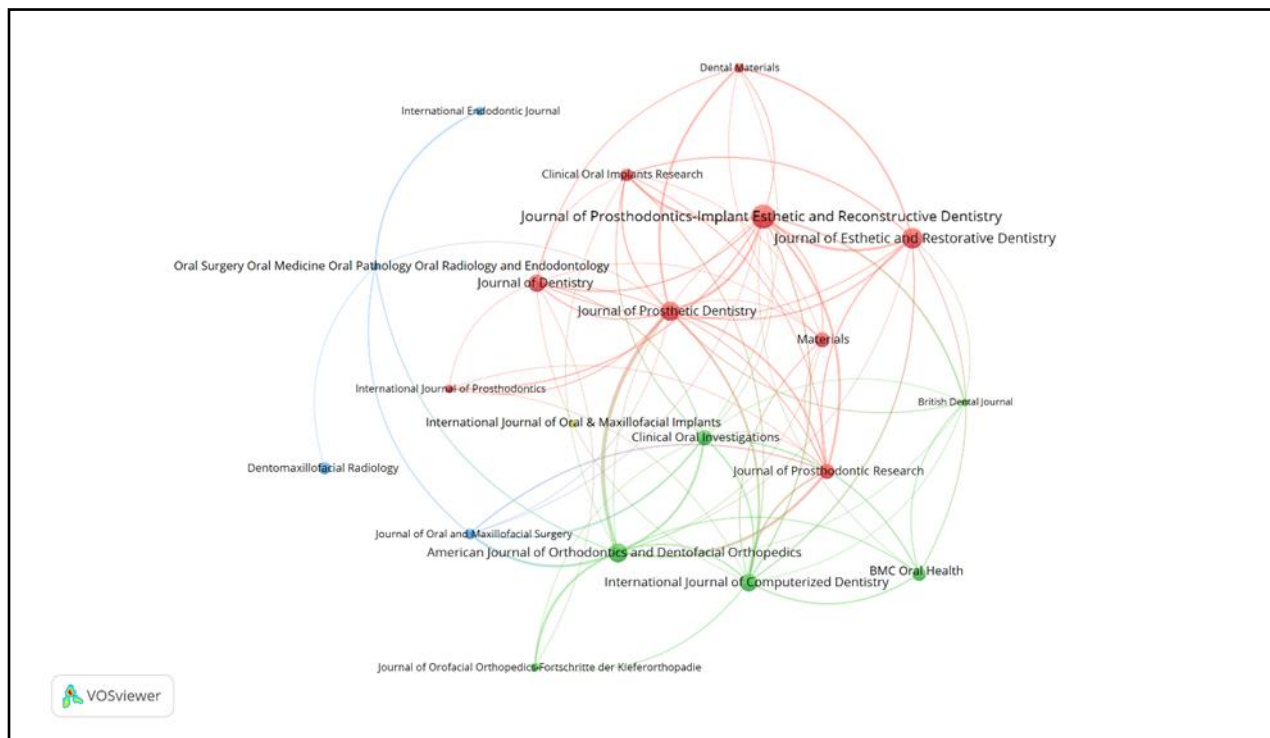
Figure 4. Collaborative publishing network

3.6. Highly cited articles

Out of 354 articles with 100 or more citations, Table 5 lists the top 11 papers. The most highly cited publications were by authors Beuer and Edelhoff, with *n*=482 citations, followed by Flügge et al., with *n*=295 citations, and Tahayeri et al., with *n*=191 citations.

Table 5. Highly cited articles

Rank	Article
1	Beuer F, Schweiger J, Edelhoff D. Digital dentistry: an overview of recent developments for CAD/CAM generated restorations. Br Dent J. 2008 May 10;204(9):505-11. doi: 10.1038/sj.bdj.2008.350.
2	Flugge, Tabea V., Stefan Schlager, Katja Nelson, Susanne Nahles, and Marc C. Metzger. "Precision of intraoral digital dental impressions with iTero and extraoral digitization with the iTero and a model scanner." American Journal of Orthodontics and Dentofacial Orthopedics 144, no. 3 (2013): 471-478.
3	Tahayeri, Anthony, MaryCatherine Morgan, Ana P. Fugolin, Despoina Bompolaki, Avathamsa Athirasala, Carmem S. Pfeifer, Jack L. Ferracane, and Luiz E. Bertassoni. "3D printed versus conventionally cured provisional crown and bridge dental materials." Dental Materials 34, no. 2 (2018): 192-200.
4	Patel, Shanon, Andrew Dawood, R. Wilson, K. Horner, and F. Mannocci. "The detection and management of root resorption lesions using intraoral radiography and cone beam computed tomography–an in vivo investigation." International endodontic journal 42, no. 9 (2009): 831-838.
5	Patel, Shanon, Andrew Dawood, R. Wilson, K. Horner, and F. Mannocci. "The detection and management of root resorption lesions using intraoral radiography and cone beam computed tomography–an in vivo investigation." International endodontic journal 42, no. 9 (2009): 831-838.
6	Ender, Andreas, Moritz Zimmermann, and Albert Mehl. "Accuracy of complete-and partial-arch impressions of actual intraoral scanning systems in vitro." International Journal of Computerized Dentistry 22, no. 1 (2019): 11-19.
7	Gateno, Jaime, James Xia, John F. Teichgraeber, Andrew Rosen, Bruce Hultgren, and Tim Vadnais. "The precision of computer-generated surgical splints." Journal of Oral and Maxillofacial Surgery 61, no. 7 (2003): 814-817.
8	Leifert, Michael F., Melvyn M. Leifert, Stella S. Efstratiadis, and Thomas J. Cangialosi. "Comparison of space analysis evaluations with digital models and plaster dental casts." American Journal of Orthodontics and Dentofacial Orthopedics 136, no. 1 (2009): 16-e1.
9	Amin, Sarah, Hans Peter Weber, Matthew Finkelman, Khaled El Rafie, Yukio Kudara, and Panos Papaspyridakos. "Digital vs. conventional full-arch implant impressions: A comparative study." Clinical oral implants research 28, no. 11 (2017): 1360-1367.
10	Wismeijer, Daniel, Ronny Mans, Michiel van Genuchten, and Hajo A. Reijers. "Patients' preferences when comparing analogue implant impressions using a polyether impression material versus digital impressions (Intraoral Scan) of dental implants." Clinical Oral Implants Research 25, no. 10 (2014): 1113-1118.
11	Joda, Tim, and German O. Gallucci. "The virtual patient in dental medicine." Clinical oral implants research 26, no. 6 (2015): 725-726.

3.7. Keywords

Figure 5 displays the most used keywords out of the 1413 keywords analysed, specifically those that had a minimum of 10 occurrences. The most frequently used keywords were Digital Dentistry (155), accuracy (111), CAD/CAM (52), Intraoral Scanners (45) and precision (38).
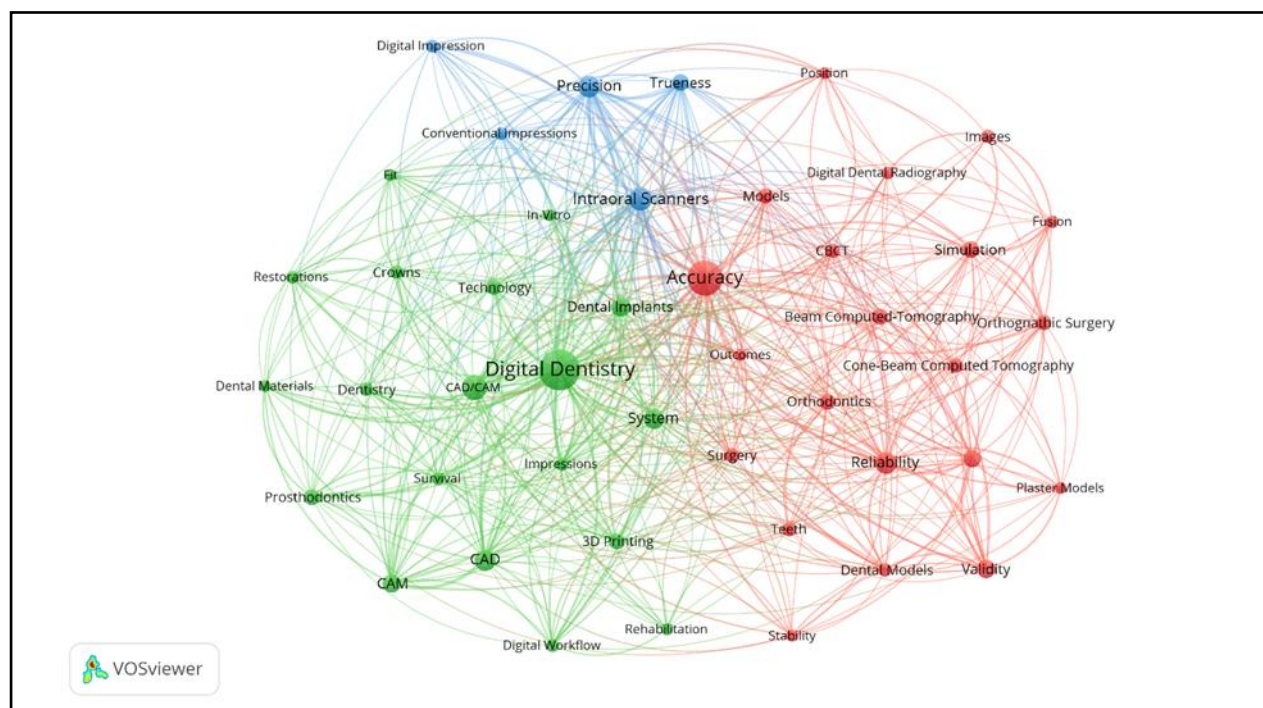
Figure 5. Frequently used keywords

4. Discussion

This study presents what is believed to be the first bibliometric analysis focused on digital dentistry, which refers to the use of dental technologies or devices that include digital or computer-controlled components instead of mechanical or electrical tools for dental procedures. Implementing digital dentistry can result in more efficient dental treatments for both restorative and diagnostic purposes and can enhance patient care.[15-17]

Although research in digital dentistry began in 1996, there has been a significant increase in the number of publications related to this field over time.[18] Out of 1383 authors, 354 papers have been published on digital dentistry, and it is expected that more research clusters around the world will promote collaboration among authors and organizations, resulting in future publications. Furthermore, the rise in bibliometric analyses focused on digital dentistry illustrates the growing enthusiasm among scholars in this domain.

As evident from this study, the United States has published the highest number of papers related to digital dentistry and has received more citations than Germany.[19] These findings align with other bibliometric analyses conducted in the past, as the United States has plentiful funding and state-of-the-art research equipment that often leads to high-impact factor publications. Additionally, as more scientific publications are produced each year, an increasing trend has emerged among authors from different countries citing articles from the United States.

The top-performing organization in the field of Digital Dentistry is the University of Michigan in the United States. Their success may be attributed to the introduction of virtual articulators and virtual mounting, leading to a full digital technique of maxillary arch scanning. King's College London in the United Kingdom ranks second because it receives the highest number of citations for published papers. Although other well-known organizations have contributed, their input into a given field is still lacking.

The number of citations in a research paper is typically directly related to its publication year. The measurable impact of publication can only be obtained after at least 20 years. Consequently, previously published research papers often have more citations than recently published articles, regardless of their impact. This trend is prevalent in various domains. The present bibliometric study indicates a growing trend of increasing citations in previously conducted research. For example, Papaspyridakos, an Associate Professor of Postgraduate Prosthodontics at Tufts University School of Dental Medicine, published 12 papers that received good citations (231). Meanwhile, Joda Tim and Beuer Florian, affiliated with the University of Bern and the University of Munich, respectively, published many papers (nine and six, respectively) with relatively high citations (201 and 529, respectively). These findings illustrate the effect of the research theme and its relevance to areas of expertise in research and clinical fields.

Various bibliometric analyses have highlighted the publication of scientific research articles in leading journals that conform to Bradford's law. According to this bibliometric law, a few leading journals account for a significant number of all publications in a given discipline, and research papers published in these journals are more likely to be classified as top articles.[20,21] In the present study, the distribution of high-citation papers closely followed Bradford's law, with the American Journal of Orthodontics and Dentofacial Orthopedics and the British Dental Journal being the top journals (with impact factors of 2.711 and 2.727, respectively) in terms of publication and citation counts (905 and 490, respectively).

The most highly cited article in this field was published by Beuer Florian in 2008, which provides an overview of the recent developments in CAD/CAM-generated restorations for digital dentistry. The second most cited article was by Flügge et al., who discussed the precision of intraoral digital dental impressions using iTero and extraoral digitization with iTero and a model scanner. The third most cited publication was by Tahayeri et al., who compared 3D printed and conventionally cured provisional crowns and bridge dental materials. Beuer Florian has made significant contributions to this field, and his influence is likely to continue in the future. His expertise is highly regarded in this area of expertise.[22-26]

Keywords are essential components of a scientific manuscript. They help by working as "coded messages" to provide the desired systematic research papers. It is crucial to choose

appropriate keywords, which can readily help and identify the relevant search.[27-30] This bibliometric analysis revealed the following keywords that are frequently utilized: digital dentistry (155), accuracy (111), CAD/CAM (52), and intraoral scanners (45).

Among its strengths, this research highlights the significant impact of 3D technology in dentistry. It examines its application in developed countries, the collaborative networks among researchers, and the influence of their findings. This analysis encourages other researchers to explore these technologies to enhance the quality of life in their own countries, while also considering expert opinions in the field.

A few limitations could be identified from the current analysis: Clarivate's Web of Science database was only used as it eliminates the other citation indexes, and more precise scientific results comparable to other databases such as PubMed, Digital Science, Scopus database, and Google Scholar. Therefore, it is quite probable that papers published in other databases, such as Scopus and Google Scholar, with higher citation counts could have been missed. Second, only papers written in English were selected; however, significantly important papers written in other languages may have been missed, but sometimes they have both foreign and English versions.

This study identified a few recommendations for future studies. Despite its limitations, this study provides insights into how knowledge related to Digital Dentistry has been disseminated and evolved over the years. Importantly, research related to Digital Dentistry has been distinctly expressed in top journals. These findings could benefit emerging researchers and budding scholars by identifying leading publications, domains, and authors in the field.

4.1. Recommendations for future studies

Further studies are needed on the impact of 3D imaging on patient outcomes in various areas of dentistry, such as orthodontics, restorative dentistry, and oral surgery.[31-35] It would be important to investigate the potential cost-effectiveness of implementing 3D imaging technology in dental practice.[32,36] Also, explore differences in the adoption and utilization of 3D imaging technology in different regions/countries.[35,37,38] On the other hand, to deepen analysis of the publication trends and patterns of research related to 3D imaging in dentistry and identify gaps or areas for future research.[32,34,36] Finally, conduct surveys or other qualitative research to understand the perspectives and experiences of dental practitioners and patients regarding the use of 3D imaging technology.[12,39]

5. Conclusions

In conclusion, digital dentistry has revolutionized the field of dentistry, making dental procedures more efficient for both restorative and diagnostic purposes. The increase in research in this field is evident from the significant increase in the number of publications since 1996. The United States published the highest number of papers related to digital dentistry and received high citations, whereas Germany published fewer papers but received the highest number of citations. The University of Michigan and King's College London have been the most productive

organizations in this field. The American Journal of Orthodontics and Dentofacial Orthopedics and the British Dental Journal were the leading journals with the highest publication and citation counts. The top three highly cited articles have contributed to the development of CAD/CAM-generated restorations, intraoral digital dental impressions, and 3D-printed dental materials. Overall, digital dentistry research has been well-represented in the top journals, and more developments and advancements are expected in the future.

Abbreviations

3D	Three-dimensional
2D	Two-dimensional
CAD/CAM	Computer-Aided Design / Computer-Aided Manufacturing

Declarations:

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.
Consent for publication: Not applicable

Data Availability Statement: The data is available upon request from the corresponding author.

Conflict of Interests: The authors declare no conflict of interest.

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